

**Integrating Web Services And Multi Agent Systems (MAS)
For Developing A Efficient E- Commerce Model**

Project Report submitted in partial fulfillment of the
requirement for the degree of

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Under the Supervision Of

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by

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to



Jaypee University of Information and Technology

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Certificate

This is to certify that project report entitled “**Integrating Web Services And Multi Agent Systems (MAS) For Developing A Efficient E- Commerce Model**” submitted by **Gaurav Rawal** in partial fulfillment for the award of degree of Bachelor of Technology in Computer Science & Engineering to Jaypee University of Information Technology, Waknaghat, Solan has been carried out under my supervision.

This work has not been submitted partially or fully to any other University or Institute for the award of this or any other degree or diploma.

Date:

Supervisor's Name

Designation

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Date:

Name of the Student

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Abstract

After the years of stagnation, there are indications that the typical “Indian Consumer” has finally come online for not most, but at least few sectors of online purchases of items some including books, electronics, gaming, entertainment, and even more.

Electronic Commerce is process of doing business through computer networks. A person sitting on his chair in front of a computer can access all the facilities of the Internet to buy or sell the products. E-Commerce, which was started in early 1990’s, has taken a great leap in the world of computers, but the fact that has hindered the growth of e-commerce is security. Security is the challenge facing e-commerce today & there is still a lot of advancement made in the field of security. The main advantage of e-commerce over traditional commerce is the user can browse online shops, compare prices and order merchandise sitting at home on their PC.

Since Internet technology is rapidly improving, more and more people are using the Internet for their business growth and cost reduction in order to achieve their business goals. Business consumers want more convenient and straightforward access to Web applications. There are many technologies that can be used to build Web services and Web applications. This web application does implement the technologies provided by Java namely JSPs, JSTL, Servlets and Java Beans.

This application allows users to register online, make purchases online, and track the order and shipping status online. It stores the persistent data into MySQL database and uses Java Database Connectivity (JDBC) to manipulate the data through calls made by the JDBC from the Web Application. The application was built using the current latest web standards. The services were designed using Java as its core programming for its business logics, while the presentational part was been done on varied technologies some including Ajax with jQuery, CSS3, and HTML5. The statistical reports were been designed and presented with Google charts API. For the most of the application’s part, the images and resources were only used when it was in a real need to have its presence to signify the item, while the rest of the presentation was done using Cascading Style Sheets. It seems varied and different streams of information meet together, when we in particular create something out of it. Here we see the structural Knowledge Management and Statistics moving hand in hand with Computing and Logical Reasoning.

Software's Used

NETBEANS



NetBeans

NetBeans is an open-source integrated development environment (IDE) for developing with Java, PHP, C++, and other programming languages. NetBeans is also referred to as a platform of modular components used for developing Java desktop applications.

NetBeans is coded in Java and runs on most operating systems with a Java Virtual Machine (JVM), including Solaris, Mac OS, and Linux.

NetBeans manages the following platform features and components:

- User settings
- Windows (placement, appearance, etc.)
- NetBeans Visual Library
- Storage
- Integrated development tools
- Framework wizard

NetBeans uses components, also known as modules, to enable software development. NetBeans dynamically installs modules and allows users to download updated features and digitally authenticated upgrades.

NetBeans IDE modules include NetBeans Profiler, a Graphical User Interface (GUI) design tool, and NetBeans JavaScript Editor.

NetBeans framework reusability simplifies Java Swing desktop application development, which provides platform extension capabilities to third-party developers.

XAMPP



XAMPP stands for Cross-Platform (X), Apache (A), MySQL (M), PHP (P) and Perl (P). It is a simple, lightweight Apache distribution that makes it extremely easy for developers to create a local web server for testing purposes. Everything you need to set up a web server – server application (Apache), database (MySQL), and scripting language (PHP) – is included in a simple extractable file. XAMPP is also cross-platform, which means it works equally well on Linux, Mac and Windows. Since most actual web server deployments use the same components as XAMPP, it makes transitioning from a local test server to a live server is extremely easy as well.

What's Included in XAMPP?

XAMPP has four primary components. These are:

- 1. Apache:** Apache is the actual web server application that processes and delivers web content to a computer. Apache is the most popular web server online, powering nearly 54% of all websites.
- 2. MySQL:** Every web application, howsoever simple or complicated, requires a database for storing collected data. MySQL, which is open source, is the world's most popular database management system. It powers everything from hobbyist websites to professional platforms like WordPress.
- 3. PHP:** PHP stands for Hypertext Preprocessor. It is a server-side scripting language that powers some of the most popular websites in the world, including WordPress and Facebook. It is open source, relatively easy to learn, and works perfectly with MySQL, making it a popular choice for web developers.

4. Perl: Perl is a high-level, dynamic programming language used extensively in network programming, system admin, etc. Although less popular for web development purposes, Perl has a lot of niche applications.

Different versions of XAMPP may have additional components such as phpMyAdmin, OpenSSL, etc. to create full-fledged web servers.

Chapter 1

1. Introduction

The Internet and World Wide Web are becoming an important channel for retail commerce as well as for business to business transactions. It is undeniable that daily life has become convenient with online shopping. People do not drive to a store, do not travel to overseas, they can purchase the commodities and get the services they want.

Forrester research, International Data Corp., and Nielsen Media Research have reported that the number of people buying, selling and performing transactions on the Web is increasing at a phenomenal pace. At present, however, the potential of the Internet for transforming commerce is largely unrealized.

Electronic purchases are still largely non-automated. So the exponentially increasing information along with the rapid expansion of the business websites causes the problem of information overload. This of course spends customers too much time on visiting flooding of retail shops on websites to know about the commodities and to survey the relevant commodity information for further comparison.

Electronic Commerce (E-commerce) seems to be everywhere these days. It's nearly impossible to read a magazine or newspaper without coming across an article about how e-commerce is going to change and affect our lives. It is widely accepted that e-commerce and Internet technologies can benefit an organization.

E-commerce offers tremendous opportunities to do business electronically, such as using electronic data interchange (EDI) and World Wide Web (WWW). The exponential growth of the Internet and the WWW created a new type of commerce: E-commerce on the Internet. E-commerce on the Internet is the exchange of goods, services and information using the Internet's capabilities.

E-commerce is fundamentally changing the economy and the way businesses are conducted today (Barua et al., 2001). It forces firms to find new ways to expand the markets, to attract and retain customers by tailoring products or services to their needs, and to restructure their business processes in order to deliver high quality products and services more efficiently and effectively.

The development of e-commerce offers a promising way for businesses to meet challenges of the ever-changing market. The fast-developing information infrastructure makes the connectivity to reach almost everywhere around the whole world possible. However, the main challenge and successfulness of running e-commerce business comes not only from technology, but also from the people who do the business. This chapter reviews e-commerce definitions, the evolution of e-commerce, the acceptance and adoption of e-commerce, the benefits of e-commerce, the factors that affect e-commerce adoption and the proposed research methodology.

Objective Of E-Commerce: -

- a. Save time.
- b. Reduce process errors.
- c. Reduce the cost of core service provision.
- d. Free staff to provide value added services.
- e. Improve morale

ISSUES WITH E-COMMERCE SYSTEM: -**TECHNICAL LIMITATIONS OF ELECTRONIC-COMMERCE:**

- a. Lack of sufficient system is standards, reliability, security and communication protocols.
- b. Not enough telecommunication bandwidth.
- c. "The software development tools are still evolving and changing rapidly"
- d. Integrating the Internet and electronic commerce software with current databases and applications difficultly.
- e. Additional cost to request special Web servers and other infrastructures, in addition to the network servers

OTHER ISSUES:

- a. Lack of feel and touch online
- b. Many complicated legal issues
- c. Rapidly changing and evolving e-business
- d. Lack of support services
- e. Insufficiently large enough number of sellers and buyers
- f. Breakdown of human relationships
- g. Inconvenient and expensive accessibility to the Internet

ADVANTAGES

It includes:

- a. Quicker and easier communications.
- b. Strengthened marketing capabilities and reach
- c. Increased hours of operation (a website provides 24 hour 7 day information to existing and potential customers)
- d. Access to broader information through research
- e. Reducing the cost of doing business by lowering transaction costs and increasing efficient methods for payment, such as using online banking and reducing stationery and postage costs.
- f. The opportunities to adopt new business models and develop tailored customer support.

1.1. Definitions

E-Commerce

Electronic commerce or ecommerce is a term for any type of business, or commercial transaction, that involves the transfer of information across the Internet. It covers a range of different types of businesses, from consumer based retail sites, through auction or music sites, to business exchanges trading goods and services between corporations. It is currently one of the most important aspects of the Internet to emerge.

Multi-Agent System

A multi-agent system (M.A.S.) is a computerized system composed of multiple interacting intelligent agents within an environment.

1.2. Purpose

- a. Selling products (e.g. Books, Electronics, Property)
- b. Online Catalogues/Brochures c. Stocks & Shares
- c. Banking

1.3.Motivation

Ecommerce became possible in 1991 when the Internet was opened to commercial use. Since that date thousands of businesses have taken up residence at web sites.

At first, the term ecommerce meant the process of execution of commercial transactions electronically with the help of the leading technologies such as Electronic Data Interchange (EDI) and Electronic Funds Transfer (EFT) which gave an opportunity for users to exchange business information and do electronic transactions. The ability to use these technologies appeared in the late 1970s and allowed business companies and organizations to send commercial documentation electronically.

Although the Internet began to advance in popularity among the general public in 1994, it took approximately four years to develop the security protocols (for example, HTTP) and DSL, which allowed rapid access and a persistent connection to the Internet. In 2000 a great number of business companies in the United States and Western Europe represented their services in the World Wide Web. At this time the meaning of the word ecommerce was changed. People began to define the term ecommerce as the process of purchasing of available goods and services over the Internet using secure connections and electronic payment services.

SCOPE AND FOCUS OF THE REPORT

The scope of E-Commerce is as wide as an ocean and there by the implementation hurdles. When one thinks of E-Commerce even though final goal remains the same as that of the traditional business, but the way in which they function in order to improve the performance is different. As information sharing is the major part of the corporate industries, networking has given boost to E-Commerce. This change in viewpoint has opened door for new opportunities.

Nationalized and Private banks agrees that adopting e-commerce as a strategy is one of the important steps the banks has taken in its development due to the tremendous benefits e-commerce adoption provides. According to them their perceived benefits include convenience to customers, speed and quality of service, reduction of queues in banking halls and reduction in the total overhead cost such as reduction in employee recruitment and reduction in space for clients and customers. These factors that pushed their drive to adopt e-commerce.

- a. The research provides powerful, real time E-Commerce reporting to help E-Commerce managers improve merchandising and increase sales.
- b. The research is very much useful to get the lifetime value of your customers based upon their acquisition source, and increase your expenditures on sources that generate the best customers over lifetime.
- c. It tracks the performance of all your online marketing initiatives, including Pay - per-click keyword buys, doing transaction online, paying bills using net banking, banner ads, e-mails and affiliate programs and also how it is effective to implement.
- d. It helps the E-Commerce to convert visitors into customers.
- e. It helps to determine whether online competitors can significantly

OBJECTIVES

Steps, which are required in the software-analysis process related to this project, are described in the following sections:

1. **Requirements Analysis:** -

Requirements analysis is a process that determines the tasks that are required to determine the needs and conditions to design a new product or to make modifications in any existing product/application. This process considers all the stakeholders conflicting requirements, analyzes the documentation and validation of the system. The requirements should be actionable, measurable, testable, and related to the defined needs of the system design

2. **Requirements Elicitation:** -

Elicitation of requirements also known as requirements gathering which includes the task of identifying various requirement types from stakeholders or from project documentation.

3. **Requirements Analysis:** -

Analysis of requirements determines if the gathered requirements are clear, complete and consistent. It also handles any ambiguous requirements that do not clearly state what needs to be implemented. As a result it can cause loss of resources and time if identified later in the development or testing phase. Requirement analysis requires identifying the stakeholders and taking their needs into account to help them understand the implications of designing the new system. To clearly elicit the stakeholders requirements different processes such as developing a scenario or user stories and identifying the use case which is being used for the project can be utilized.

According to the stakeholders analysis if we want to gather the requirements of the project analysts first need is to identify the stakeholders. Stakeholders are people or organizations that have valid interest or use in the system. The steps, which are used to identify the stakeholders, are as follows:

- Anyone who operates the system.
- Anyone who benefits from the system
- Anyone who is directly or indirectly involved in purchasing system
- People or organizations opposed to the system
- Organizations responsible for the system design
- Organizations that regulate the financial or safety aspects of the system

Once the stakeholders are successfully identified, interviews are conducted through different processes; the needs and requirements of the system are identified, and a requirements specification document is prepared. The document is then discussed with the major stakeholders to identify any ambiguity with the requirements and understanding of the system.

4. **Requirements Documentation:**

This step involves documenting the requirements in various forms, including summary lists, natural language documents, visual documents, use cases, user stories, or process specifications. A requirement specification document is categorized in different ways according to the stakeholders need, helping to create a clear contract between development and business. The following sections include the different 9 categories of requirements specification document that are essential for designing this application: the functional requirements, constraints, system requirements, etc.

DETAILED SCOPE

This project is supposed to be delivered in three phases, with each phase being an add-on to the project that makes it more usable and acceptable.

1. In the first delivery, the application must be able to add an item to the cart.

- Browse categories on the home page.
- Select a category and browse through the items.
- View more information about an item.
- Add an item to the store.
- Continue shopping or go to checkout for the item.

2. The application must be able to check out the items in the store.

- Check out the items.
- Continue shopping.
- Delete the items to update the cart.

3. The application asks for user authentication before checking out.

- Add items to the cart.
- Check out the items.
- Log in with a valid username and password.

4. The application must bring up the order form for the check out.

- Complete the information on the order form.
- Place the order.

Chapter 2

2. System Requirement Specification

2.1. Hardware Requirements

- a. An Intel based Core2Duo E7500 + or An AMD based Athlon II x2 245 +
- b. RAM 2GB+
- c. Storage considerable accordingly to the amount of resources being used.
Approximately: 120GB+ HDD Storage Capacity • Apache Tomcat 7+ or Glassfish

2.2. Software Requirements

The System being built in Java need not have to consider having options in OS as of now it can run on any operating system, Provided it has java configured on it.

2.3. Functional Requirements

2.3.1. User Roles & Profiles:

- a. The customer, the person that connects to the on-line e-commerce front-end and browses the product catalog or places an order.
- b. The sales manager. The person is the company that looks after the sales orders and ensures that all the sales operations work correctly.

2.3.2. Business Process Definition:

- a. Search the product catalog.
- b. Browse the product catalog.
- c. Making an order using an on-line front-end.
- d. Notifying the customer that is not enough stock.
- e. Generate an invoice for an order that has been completed.

2.3.3. Customer Management:

It's a common scenario that a new user registers using the e-commerce front-end to be able to perform a commercial transaction later. It should be possible to:

- a. Check if a customer already exists.
- b. Create new customers.
- c. Modify the information of a customer.

2.3.4. Product Catalog:

A product catalog contains all the products that a user can view.

- a. Browse the product catalog hierarchically sorted by alphabetically by product name.
- b. Browse the product catalog hierarchically by product category.
- c. Search the product catalog.
- d. Get all the details of a product.

Every product object can contain at least the following details:

- a. Product name.
- b. Product description.
- c. Product category.
- d. Product attributes (*weight, color, size*).
- e. Product price and tax.

It should be possible for users to query product's inventory availability. This can be displayed when the user is viewing the product information.

2.3.5. Sales Order:

It should be possible for a user to:

- a. Perform a full sales order.
- b. Modify or cancel an order once it has been created in the system.
- c. Get a list of the products that has been bought.
- d. Track the status of the orders pending to be sent.

2.3.6. Invoicing:

It should be possible for the e-commerce system:

- a. Get access to the full invoice object to render an invoice by itself.
- b. Get a PDF version of an invoice using the default server report.

Chapter 3

3. Literature Review

3.1. Overview

E-commerce means, “*doing of business electronically*”. It encompasses many diverse activities from electronic trading of goods and services until after-sales service.

Electronic Commerce or E-commerce is growing extensively on Internet. Although the term of "*E-commerce*" might sound bizarre, in reality it has been familiar activity: buy books online. Where as some of people take these simple activities every day.

Electronic Commerce (E-commerce) seems to be everywhere these days. It's nearly impossible to read a magazine or newspaper without coming across an article about how e-commerce is going to change and affect our lives. It is widely accepted that e-commerce and Internet technologies can benefit an organization.

E-commerce offers tremendous opportunities to do business electronically, such as using electronic data interchange (EDI) and World Wide Web (WWW). The exponential growth of the Internet and the WWW created a new type of commerce: E-commerce on the Internet. E-commerce on the Internet is the exchange of goods, services and information using the Internet's capabilities.

E-commerce is fundamentally changing the economy and the way businesses are conducted today. It forces firms to find new ways to expand the markets, to attract and retain customers by tailoring products or services to their needs, and to restructure their business processes in order to deliver high quality products and services more efficiently and effectively.

The development of e-commerce offers a promising way for businesses to meet challenges of the ever-changing market. The fast-developing information infrastructure makes the connectivity to reach almost everywhere around the whole world possible. However, the main challenge and successfulness of running e-commerce business comes not only from technology, but also from the people who do the business.

3.2. Background

The Internet took a giant leap into the modern age in 1991 when a computer scientist working under contract for CERN "Tim Berners-Lee" made a huge advancement by communicating via the Internet using HTTP. The birth of the World Wide Web was upon us! He is now considered the father of the World Wide Web. This opened up the door for everyday people like you and me to use this wonderful new technology, however it was not until 1994 that the first truly user-friendly browser was developed with built in security protocol to protect peoples personal information online. This made way for secure transactions to be conducted on the Internet. A year later 3rd party credit card payment services became available to the still small online community. The stage was set, and the future of Ecommerce was about to take off.

In 1995, with the introduction of online payment methods, two companies that we all know today took their first steps into the world of Ecommerce. Today Amazon and EBay are both amongst the most successful companies on the Internet! One month after selling his first book online, founder of Amazon Jeff Bezos was selling to every state in the U.S and over 40 other countries. Ecommerce allowed the easy processing of orders and shipping also enabling him to buy directly from the publishers.

From its humble beginning in 1995 modern Ecommerce has become the fastest growing area of business, showing continued growth year after year.

Technology has advanced further making it so much more accessible to people from all walks of life, and entire industries have been built around Ecommerce, which are today, the who's who of the business world.

Today virtually anything can be purchased online, from your pizza to your car. And people love to shop online. If there is one thing we can learn from the history of Ecommerce it is that anyone given a little motivation and drive can become successful. It has never been easier to get a foothold into the exciting online world of Ecommerce; all anyone needs is an Internet connection a computer and an idea. The advantages of Ecommerce are endless.

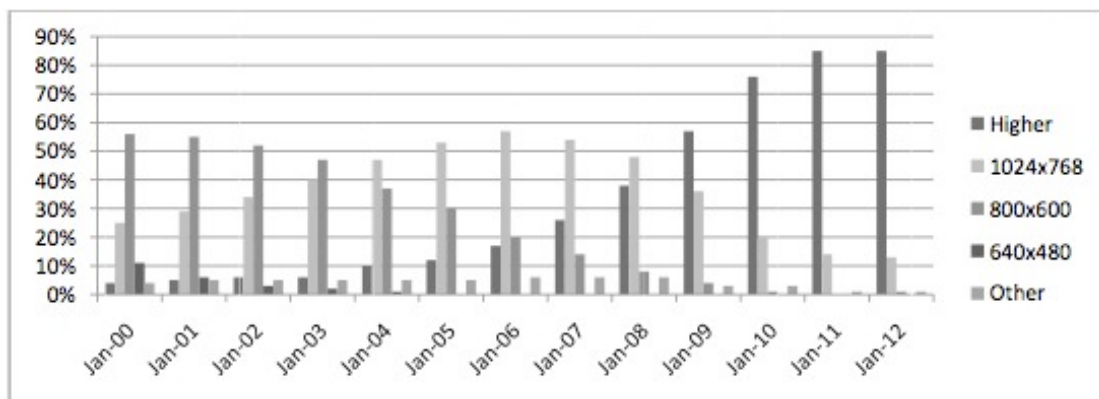
Ecommerce has become the great leveler, giving anyone the ability to build an Ecommerce website, and sell to a worldwide market with outstanding results.

3.3.Detailed Description

As this entire project would be a web based software that will monitor the client's sales and expenses, hence according to W3Schools.org had recorded the monitoring of the usages of the client browser and on what devices are the web pages been viewed and on what resolutions. So according to the statistics the website was been designed in consideration of the top three web browsers which rendered Web kit Engine supported by Google Chrome as well as Apple Safari, and Moz engine by Mozilla Firefox which had the structured in HTML5 and in CSS3. Hence the designs are clearly meant to support the current latest version of the top browsers including Google Chrome, Apple Safari, and Mozilla Firefox.

3.3.1. Browser Screen Resolutions:

The devices screen resolutions the pages are been viewed, as shown as per the recordings done by w3Schools.org are as follows:



Thus keeping this, the designs of the website was been decided to have a screen resolution of higher than 1024x768 which was design on a 1280x720p resolution that fits on most of the computing devices.

3.3.2. Use Case Diagrams:

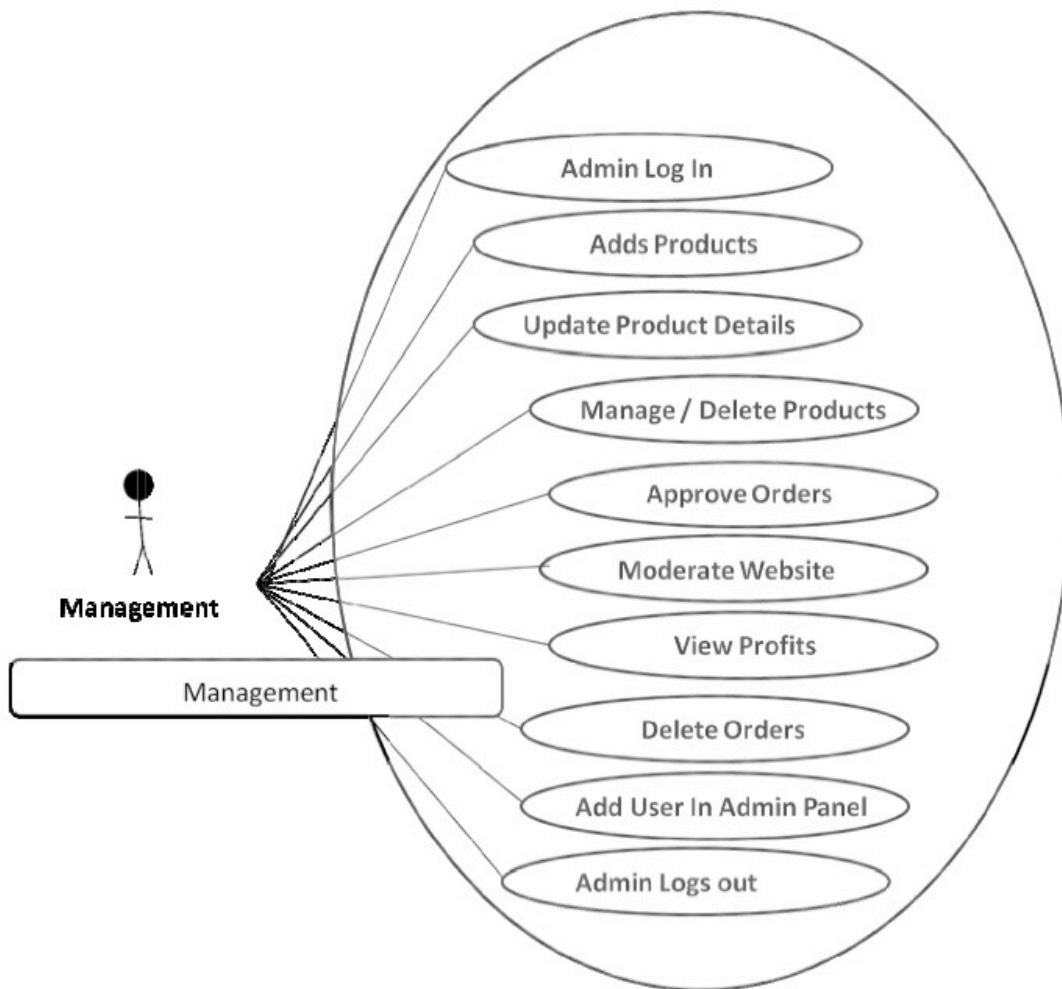


Fig: Management Client Side

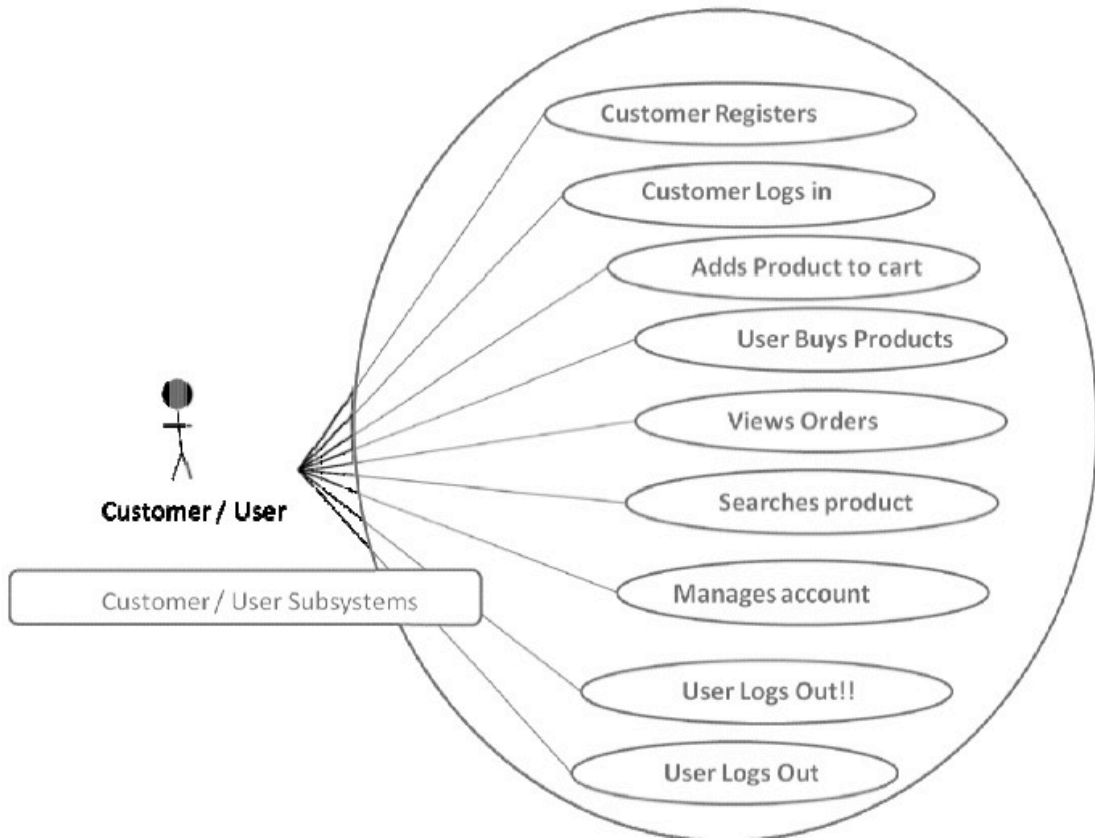


Fig: Management User Side

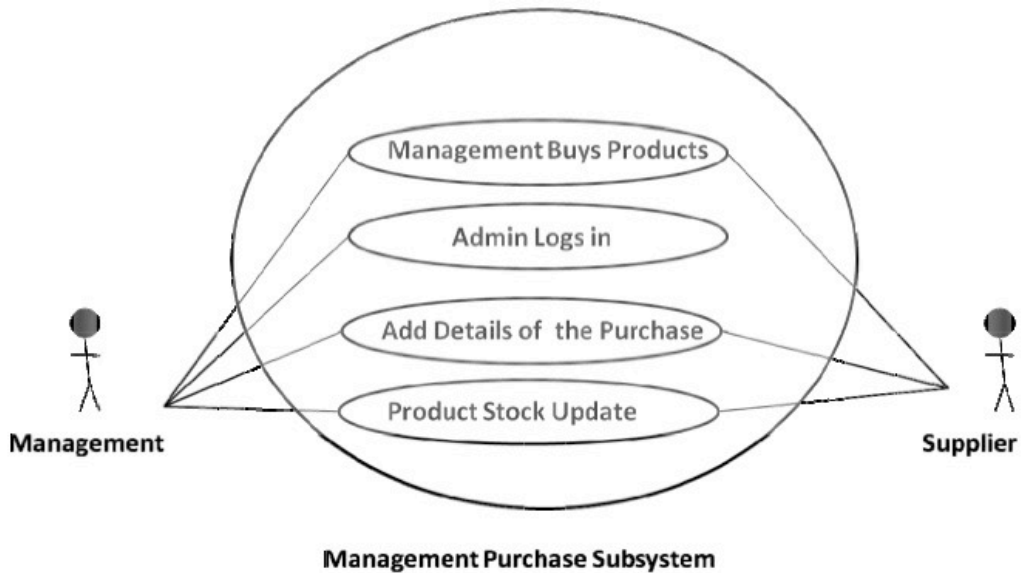


Fig: Management Of Purchase System

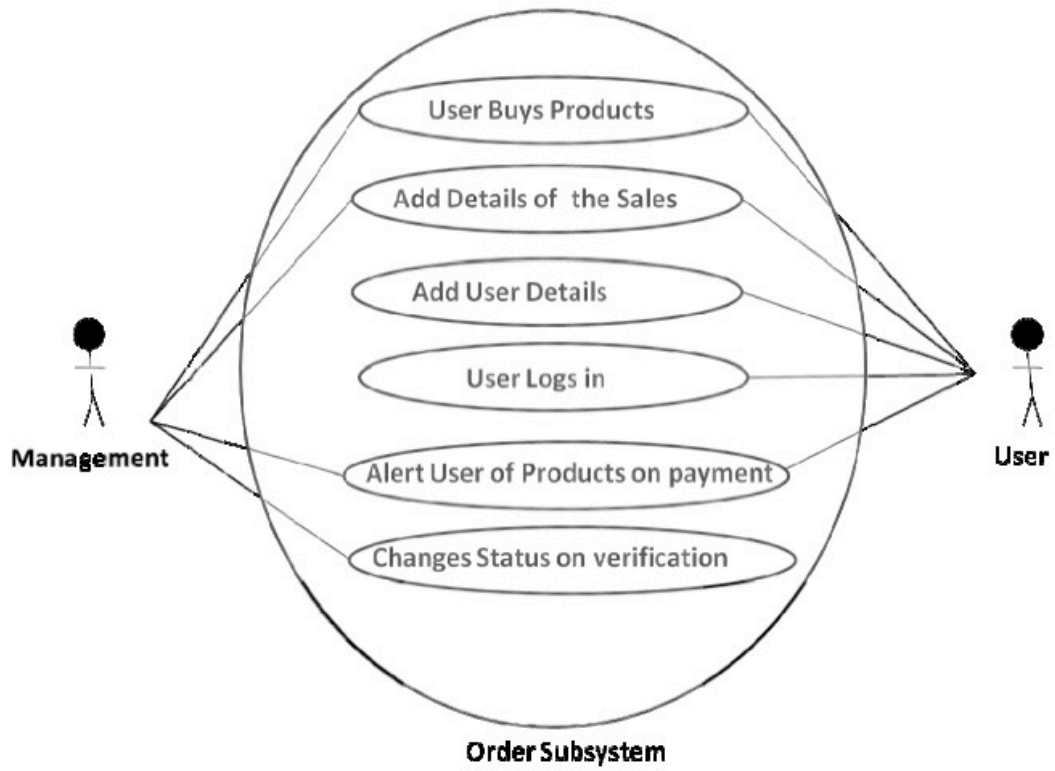


Fig: Management Of Order System

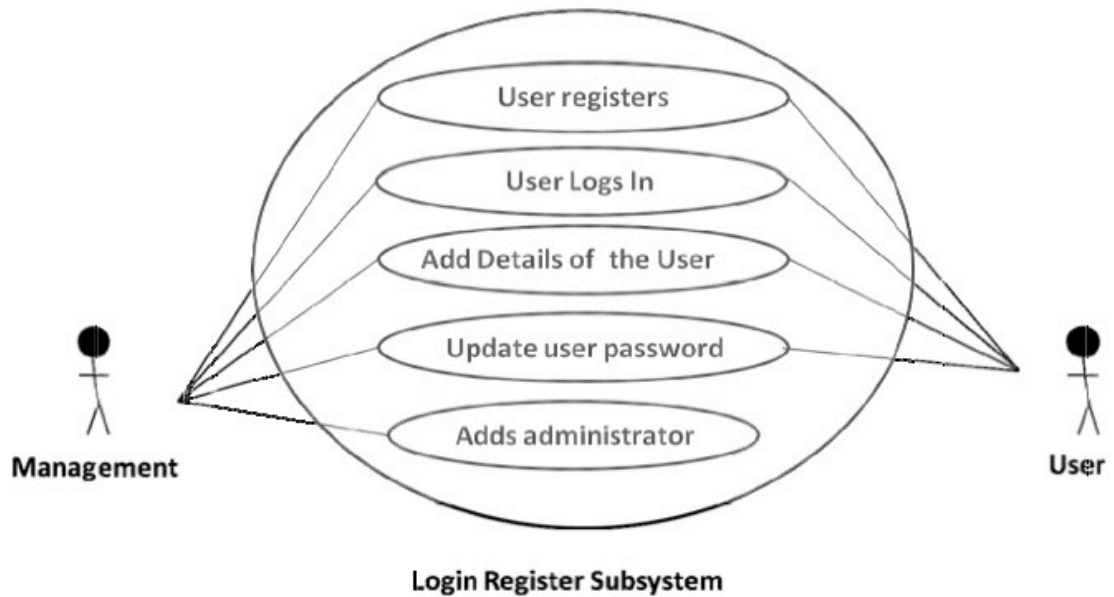


Fig: Management Of Login Register System

3.3.3. E-Commerce Platform:

As a result of given research the model of the E-commerce Platform targeted at online trading and auction systems, e-markets and private trading exchanges was developed.

Software agents lie at the heart of the platform, automating the business processes that match buyer and sellers.

The platform may support e-commerce activity across a wide range of markets and industries.

The platform consists of a series of modules supporting different business processes, such as auctions, tenders and negotiations. The modular approach allows the flexibility to implement the most appropriate solution and add additional modules as required. The platform can be delivered as a buy-side, sell-side, broker or marketplace solution.

E-commerce platform modules are Core module (Market Owner's Module); Software agents (E-Commerce Platform Agents); Auction module; Sourcing module; Negotiation module as shown in the figure below

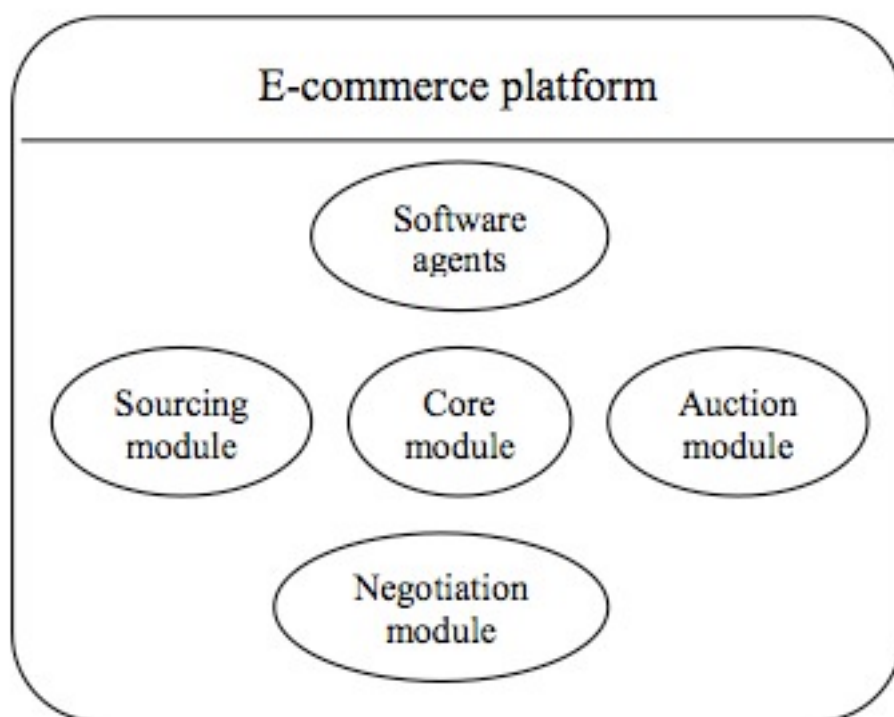


Fig: The model of the E-commerce Platform

In order to build an appropriate E-commerce platform the Agent Business Analysis should be done.

Agent Business Analysis Process enables the roles and interactions that are involved in providing the client's service to be understood. This understanding enables to identify and define the specific value added functions that agents can play in delivering the service. From this information a prototype solution that assists the client in determining how and where best to deploy agent-based solutions is created.

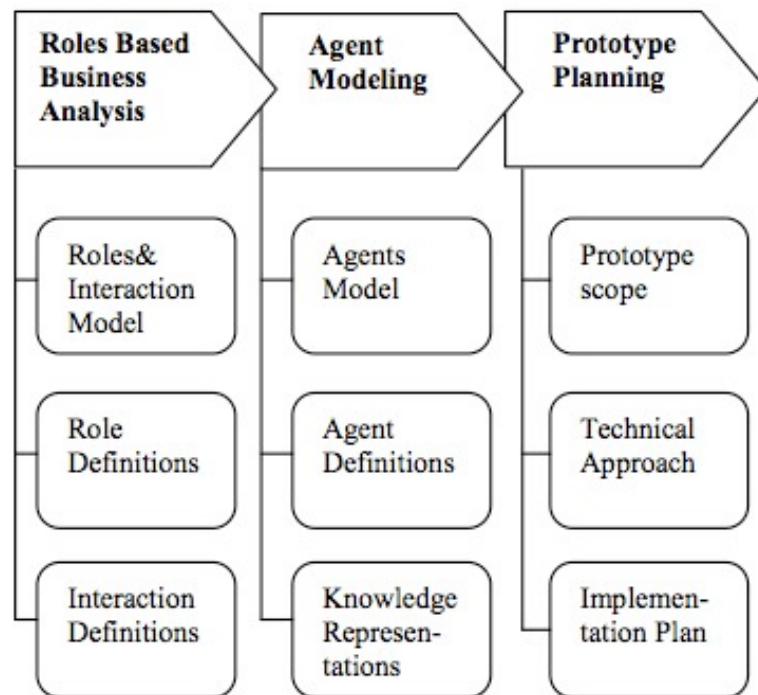


Fig: Agent Business Analysis

Stage 1: Roles-based Business Analysis:

This stage maps out the roles in the client's business process of the agreed domain. The starting point is a consideration of the human roles and the information resources that each role uses. The interactions between these roles are identified and added to form a roles and interaction model.

Stage 2: Agent Modeling:

This stage identifies the agents required to perform the roles in the Roles and Interaction Model. A role can be implemented in a single agent, or an agent may embrace and perform multiple roles. It is important to establish the business benefit that comes from deciding to use an agent to perform a specific role. Some roles may be better implemented using standard non-agent solutions.

The resulting Agent Model illustrates the boundaries of the agent system, the population of agents required to realize the business goals and the communication links between the agents.

For agents to understand and respond to their environment they must share a common language describing the business terms and concepts. Another key element of the Agent Definition process is therefore a consideration of the Knowledge Representations they will use.

Stage 3: Prototype Planning:

On this stage the most appropriate functionality for the prototype is defined. It is essential that the functionality included in a prototype is aligned with the client's business objectives rather than driven by technical capabilities. A key input to defining the Prototype Scope is therefore the evaluation criteria that will be applied to the prototype.

Today's business environment is highly connected, global and extremely competitive. There is increasing demand for greater responsiveness to market challenges and opportunities. In turn this demands greater flexibility in business processes. We are certain that multi-agent software is the correct approach to creating responsive and adaptable business solutions to meet these demands.

Multi-agent systems are designed to handle changing and dynamic business processes. They continue to operate even when there may be incomplete information, but a decision must still be made by the most effective method. Properly integrated into a business process they can offer flexible and intelligently adaptable systems support, which will consistently out perform monolithic and cumbersome traditional systems.

Any organization with complex and distributed business processes can benefit from multi-agent technology.

3.3.4. Reasons To Use Multi-Agent Systems

It would be incorrectly to claim that MAS should be used when designing all complex systems. Like any useful approach, there are some situations for which it is particularly appropriate, and others for which it is not. The goal of this section is to underscore the need for and usefulness of MAS while giving characteristics of typical domains that can benefit from it.

The most important reason to use MAS when designing a system is that some domains require it. In particular, if there are different people or organizations with different (possibly conflicting) goals and proprietary information, then a multi-agent system is needed to handle their interactions. Even if each organization wants to model its internal affairs with a single system, the organizations will not give authority to any single person

to build a system that represents them all: the different organizations will need their own systems that reflect their capabilities and priorities.

The only feasible solution is to allow the various companies to create their own agents that accurately represent their goals and interests. They must then be combined into a multi-agent system with the aid of some of the techniques described in this article.

Even in domains that could conceivably use systems that are not distributed, there are several possible reasons to use MAS. Having multiple agents could speed up a system's operation by providing a method for parallel computation. For instance, a domain that is easily broken into components – several independent tasks that can be handled by separate agents – could benefit from MAS. Furthermore, the parallelism of MAS can help deal with time limitations.

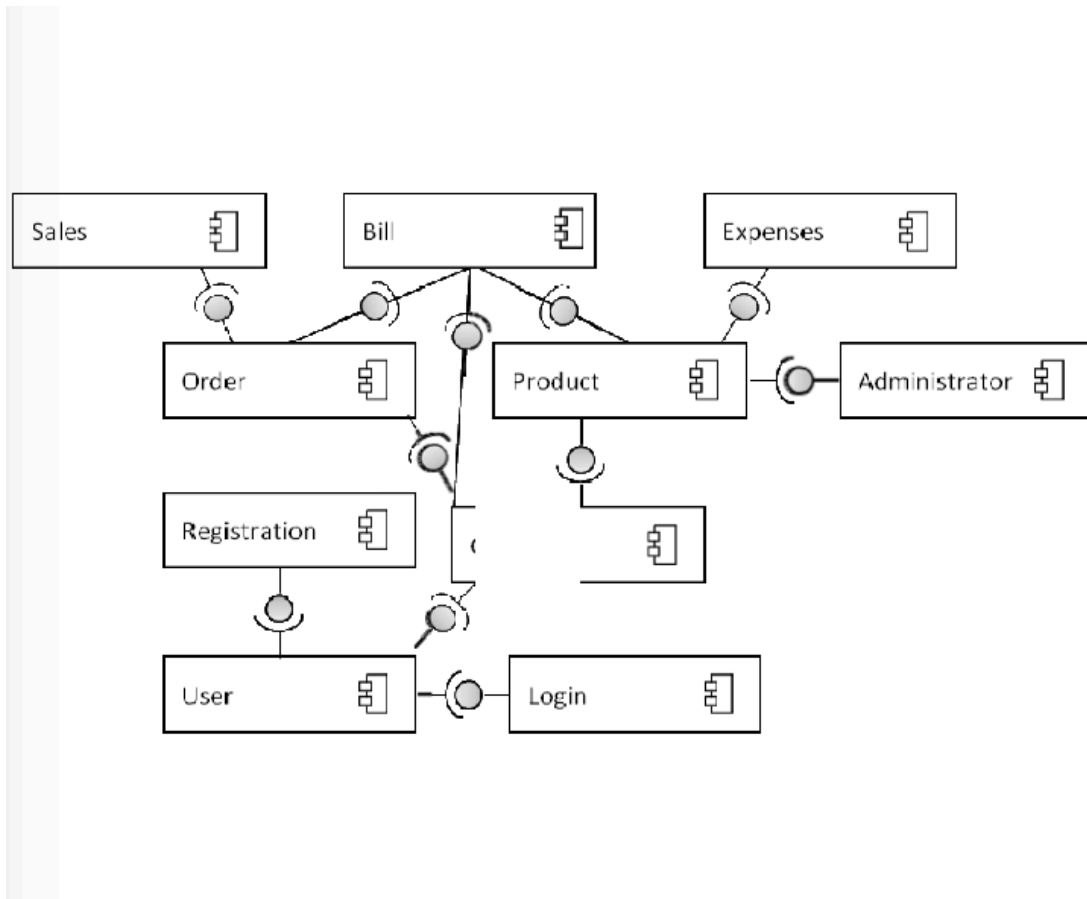
While parallelism is achieved by assigning different tasks or abilities to different agents, robustness is a benefit of multi-agent systems that have redundant agents. If control and responsibilities are sufficiently shared among different agents, the system can tolerate failures by one or more of the agents. Domains that are in particular need of this feature of MAS: if a single entity – processor or agent – controls everything, then the entire system could crash if there is a single failure.

Another benefit of multi-agent systems is their scalability. Since they are inherently modular, it should be easier to add new agents to a multi-agent system than it is to add new capabilities to a monolithic system. Systems whose capabilities and parameters are likely to need to change over time or across agents can also benefit from this advantage of MAS.

From a programmer's perspective the modularity of multi-agent systems can lead to simpler programming. Of course there are some domains with centralized control where no parallel actions are possible and there is no action uncertainty. Single-agent systems should be used in such cases.

Finally, multi-agent systems can be useful for their clarification of intelligence.

3.3.5. Component Diagram:



3.3.6. List of Tables and Attributes:

#	Type	Collation	Null	Default	Extra	Action
1	<u>product_id</u>	int(10)	UNSIGNED	No	None	AUTO_INCREMENT
2	product-name	varchar(40)		No	None	
3	sub-category-name	varchar(40)		No	None	
4	category-name	varchar(40)		No	None	
5	company-name	varchar(40)		No	None	
6	price	double(10,2)	UNSIGNED	No	None	
7	summary	text		Yes	NULL	
8	tags	varchar(255)		No	None	
9	product_qty	int(11)	UNSIGNED	No	None	
10	lastUpdated	datetime		No	None	
11	hits	int(10)	UNSIGNED	No	None	

Fig: Product Table

#	Type	Collation	Null	Default	Extra	Action
1	<u>category_id</u>	int(255)	UNSIGNED	No	None	AUTO_INCREMENT
2	category_name	varchar(30)		No	None	

Fig: Category Table

#	Type	Collation	Null	Default	Extra	Action
1	<u>subcategory_id</u>	int(10)	UNSIGNED	No	None	AUTO_INCREMENT
2	sub-category_name	varchar(30)		No	None	
3	category_name	varchar(30)		No	None	

Fig: Sub-Category Table

#	Type	Collation	Null	Default	Extra	Action
1	<u>image-id</u>	int(10)	UNSIGNED	No	None	AUTO_INCREMENT
2	image-name	varchar(255)		No	None	
3	product-name	varchar(255)		No	None	

Fig: Images Table

#	Type	Collation	Null	Default	Extra	Action
1	<u>user_id</u>	int(10)	UNSIGNED	No	None	AUTO_INCREMENT
2	email	varchar(50)		No	None	
3	pass	varchar(40)		No	None	
4	registeredOn	datetime		No	None	

Fig: User Table

#	Type	Collation	Null	Default	Extra	Action
1	<u>admin_id</u>	int(10)	UNSIGNED	No	None	AUTO_INCREMENT
2	email	varchar(45)		No	None	
3	password	varchar(45)		No	None	

Fig: Administrators Table

#	Type	Collation	Null	Default	Extra	Action
1	<u>userDetail_id</u>	int(11)		No	None	AUTO_INCREMENT
2	user_id	int(11)		No	None	
3	username	varchar(30)		No	None	
4	mobile_no	varchar(10)		No	None	
5	address	varchar(100)		No	None	
6	gender	enum('male', 'female')		No	None	
7	userImage	text		No	None	

Fig: User Details Table

#	Type	Collation	Null	Default	Extra	Action
1	<u>order_id</u>	int(11)		No	None	AUTO_INCREMENT
2	user_id	int(11)		No	None	
3	status	enum('pending', 'approved', 'delivered')		No	None	
4	shippers_name	varchar(30)		No	None	
5	address	varchar(120)		No	None	
6	mobile_number	varchar(10)		No	None	
7	shippers_email	varchar(45)		No	None	
8	ordered_On	datetime		No	None	
9	total_order_price	double(10,2)	UNSIGNED	No	None	

Fig: Order Table

#	Type	Collation	Null	Default	Extra	Action
1	<u>sales_id</u>	int(10)	UNSIGNED	No	None	AUTO_INCREMENT
2	order_id	int(10)	UNSIGNED	No	None	
3	product_id	int(11)		No	None	
4	product_name	varchar(255)		No	None	
5	product_price	double(10,2)		No	None	
6	product_quantity	int(10)	UNSIGNED	No	None	
7	sold_on	datetime		No	None	
8	user_id	int(11)		No	None	

Fig: Sales Table

#	Type	Collation	Null	Default	Extra	Action
1	<u>expenses_id</u>	int(10)	UNSIGNED	No	None	AUTO_INCREMENT
2	product_id	int(11)		No	None	
3	product_name	varchar(255)		No	None	
4	price	float		No	None	
5	purchase_date	datetime		No	None	

Fig: Expenses Table

3.4 BENEFITS OF E-COMMERCE

E-commerce is fundamentally changing the economy and the way businesses are conducted today. It forces organizations to find new ways to expand their markets, to attract and retain customers by tailoring products and services to their needs, and to restructure their business processes in order to deliver high quality products and services more efficiently and effectively.

There are lots of benefits that organizations need to be aware of when deciding whether the use of e-commerce in their business can benefit their organization. Different people might view the importance level of the e-commerce benefits differently. Some benefits of adopting e-commerce for the companies or organizations include improved customer service, better inventory control, lower marketing and distribution costs, reduced cycle time, increased market reach, reduced operation costs, global connectivity, high accessibility, scalability, interoperability, and interactivity.

Despite the economic slowdowns, e-business continues to grow. Yet, it is not certain if companies adopting e-commerce are actually realizing the benefits or are implementing e-commerce just to remain competitive.

3.4.1 Improved Speed Of Delivery

Speed of delivery is the time it takes for an organization to deliver its products or services to their business partners. It means the total time it takes to deliver the product will decrease because of e-commerce technology adoption. E-commerce system can make the business process faster since it works 24 hours as long as the server is on. Besides that, certain things can be delivered online immediately after the customer has made the payment, such as software and songs can be downloaded online and voucher can be self printed.

3.4.2 Improved Markets Reach

E-commerce is not restricted by geographical location. Market reach is the ability of an organization to reach a larger number of trading partners and consumers. Since e-commerce is using World Wide Web, it can reach larger market in world easily and not only those who is near by.

3.4.3 Reduced Cycle Time And Time To Market

The time it takes from start to finish to produce one unit of product or the time it takes to provide a service from beginning through completion is known as cycle time. An operational benefit is perceived if after e-commerce adoption the organization realizes reduced cycle times. The time from the inception of an idea until the actual product is made available for sale in the market is the definition of time to market. An operational benefit is perceived if the organization is able to increase its production and provide

services to their customers faster than prior to e-commerce adoption (Pauline, 2002). Some businessmen spend most of their time on traveling for business purposes. The organization can reduce unnecessary traveling by search and order the raw material online, which will then reduce the production and cycle time.

3.4.4 Improved Customer Service

Improved customer service refers to the quality of tasks that an organization performs to increase sales, retain its customers and improve the quality of services provided to the customer. It is achieved if the level of satisfaction the customer experiences from conducting business with the organization is raised after e-commerce adoption. This in turn increases the customer's loyalty and purchasing behaviors. By having more information available and a well-designed database, businesses can add value to their customers by providing better services such as personalized advertising and offering goods based on their shopping history.

3.4.5 Reduced Errors

E-commerce transactions have reference numbers so that transactions reach the receiving trading partners in a correct, complete and accurate manner. By enforcing proper integrity mechanisms, organizations are able to experience reduced errors (Pauline, 2002). Some errors occurred in business process are human error due to lots of paper work are involved. Therefore, e-commerce will be able to reduce errors since most of the transaction run automatically by computer, especially those e-commerce systems which have been implemented and tested for long time.

3.4.6 Better Inventory Management

The daily production involves maintaining, organizing, and accounting for product inventory. It was realized when the inventory control processes are made simpler or eliminated and at the same time are able to handle inventory, thus ensuring that there will be no large stockpiles of inventory, while simultaneously reducing out of stock situations. Some of the companies, especially those big organizations, are facing inventory problem, as keeping track of warehouse or stock is not easy. So, with the use of e-commerce, which comes with, computerize inventory system, the organization will be able to manage their inventory easier.

3.4.7 Reduced costs

The costs experienced by organizations in their daily business operations from paperwork, paying bills and making products or delivering services are largely reduced due to the automation processes of e-commerce applications. These include operational costs, administrative costs, and transaction costs. This benefit is realized when the total costs after e-commerce adoption are lower than the costs of operating the business before adopting e-commerce.

3.4.8 Improved Flow Of Information

Improved flow of information refers to the ability of e-commerce applications to provide compatible technology infrastructures and authorized mechanisms both internally and externally to accurately communicate information between employees, customers and trading partners. Communication channel is able to transmit timely, accurate and correct information thus enabling strategic decisions to be made (Pauline, 2002). Since e-commerce is running online, it not only allows the sharing of data in controlled environments, but also to manage workflows efficiently.

3.5 ADOPTION OF E-COMMERCE

Online shopping was introduced to the market in the last decade as many individuals and organizations purchase through the World Wide Web. Recently, e-commerce or commercial activity on the Internet is a rapidly growing business medium in Malaysia. However, most users don't know how it works and little has been published concerning the views of e-commerce users.

Year 1995 was considered the beginning of the internet age in Malaysia. The growth in the number of Internet hosts in Malaysia began around 1996. It is hard to determine the actual figure of online users in Malaysia, as some of the online users are not registered as Internet subscribers, and access the Internet at their workplaces, schools, colleges, universities, Internet cafes or friends' places.

Working Of The Project Model:

User Authentication:

This class is utilized to get user information from the database and is for authenticating the users. The description of each class is listed below.

a. **Authenticate User:**

This message is used to authenticate a particular user who has provided the login credentials and wishes to login in the system. This method checks the credentials in the database.

b. **Check User Name:**

This method checks to see if the provided username already exists in the database. If there is an existing user with the same name, then the user is prompted to select another username to create an account.

c. **Register User:**

This method allows a new user to register for an online shopping-store Account by entering a valid username and password. If the username already exists in database, the user will be prompted to choose another name.

d. **Login User:**

This method allows the existing users to log in to the database with the credentials they used for first registering into the application.

e. **Database Controller:**

This class is used for getting users and product information from the database, and it is also used to update the database with the information about new-user registration, product checkout, and user details.

f. **Initialize DB:**

This method allows the initialization of a database.

g. **Retrieve Items List:**

This method fetches all items from the code/workspace into the database and allows the administrator to view information about the items.

h. **Retrieve User's Details:**

This role locates all the registered users in the database and also fetches any new user who registers by completing the user-authentication form.

1. Get Ordered Product Details:

This role inputs the details of the order once the items are checked out and the order is successfully placed. This role updates the row in the database to show the details of products that have been checked out.

2. Place Order:

This class is used to process all information regarding the order of products. **Get Checkout Information:** This method provides information about items in the shopping store once the checkout method is called. This will further invoke the user-authentication method.

Get User Authentication:

This method fetches the user-authentication information. The place-order class is invoked once all three methods are successfully called. If the user authentication fails, the place-order class is not executed.

Retrieve Order Form Information:

This method is executed once user authentication is a success. This method evaluates an order form on the UI for dynamic input from the user. If any of the information is incomplete or is invalid, then an error message is depicted, and the place-order class is not called.

3. Checkout:

This class invokes the checkout button. The checkout class is only called when there are items in the inventory of the store. In the case of an empty store, the checkout class is not called, thus no checkout option is available on user-interface screen.

Chapter 4

4. Implementation Details

Mainly the project is built in JAVA with backend support of MYSQL.

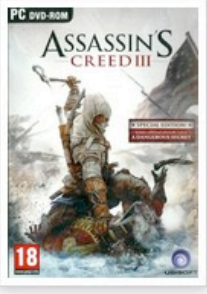



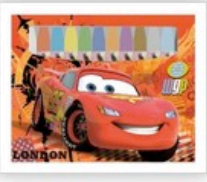



4.1.1. Navigation Bar:



This is the navigation and search bar in which you can search for an item and a pop-down menu will drop as soon as it finds matches. You can also get to the pages like home, products, contacts and Frequently Asked Questions (FAQ) directly from here.

4.1.2. Main Page:

Top Most Viewed Products Currently

 <p>Assassins Creed III By Ubisoft Games Rs. 600.00</p>	 <p>Assassins Creed Revelations By Ubisoft Games Rs. 450.00</p>	 <p>Angry Birds By Rovio Games Rs. 50.00</p>	 <p>Safe 2012 By Warner Bros. Movies Rs. 150.00</p>
 <p>Cars Oil Pastels By Disney Stationaries Rs. 100.00</p>	 <p>Grand Theft Auto IV By Rockstar Games Rs. 460.00</p>	 <p>Philips Jogs Headsets By Philips Computers Rs. 700.00</p>	 <p>Call Of Duty - Black Ops By Activision Games Rs. 300.00</p>

The main home page advertises the products that have been most viewed by the users to let the users know what's trending and to give them better options and increase sales of

4.1.3. Product Page:

Angry Birds- Rovio Games

Category :Games > Puzzle

Priced At **Rs. 50.00**

Summary Of this item

[Buy This Product Now](#)

Summary of Angry Birds

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

Curabitur pretium tincidunt lacus. Nulla gravida orci a odio. Nullam varius, turpis et commodo pharetra, est eros bibendum elit, nec luctus magna felis sollicitudin mauris. Integer in mauris eu nibh euismod gravida. Duis ac tellus et risus vulputate vehicula. Donec lobortis risus a elit. Etiam tempor. Ut ullamcorper, ligula eu tempor congue, eros est euismod turpis, id tincidunt sapien risus a quam. Maecenas fermentum consequat mi. Donec fermentum. Pellentesque malesuada nulla a mi. Duis sapien sem, aliquet nec, commodo eget, consequat quis, neque. Aliquam faucibus, elit ut dictum aliquet, felis nisl adipiscing sapien, sed malesuada diam lacus eget erat. Cras mollis scelerisque nunc. Nullam arcu. Aliquam consequat. Curabitur augue lorem, dapibus quis, laoreet et, pretium ac, nisi. Aenean magna nisl, mollis quis, molestie eu, feugiat in, orci. In hac habitasse






The data for the product is fetched dynamically from the database stored. It consists of Java Server Pages (JSP) and based on the id's of the product the information gets updated from the database.

4.1.4. Gallery:

[Buy This Product Now](#)




Click on the right side of the image to move forward.

Image 1 of 3

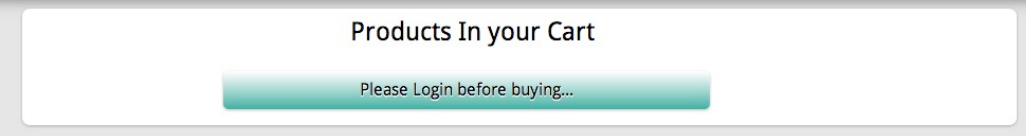
You can view the gallery of any items; it will contain more detailed pictures about the product.

4.1.5. Buying The Product:



Buy This Product Now

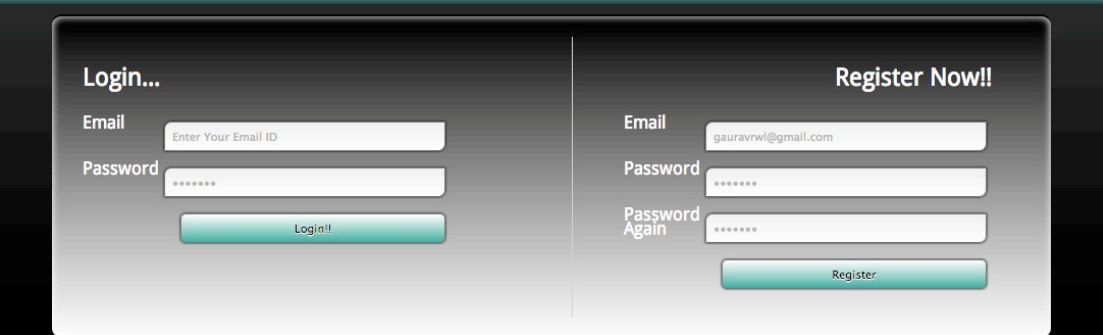
On every product page, you get option to buy the product. You can click on it and you are taken to a login page before you can buy the product.



Products In your Cart

Please Login before buying...

You will need to login to buy the product. You will get an option to create a new account or if you already have one, you will be asked to login.



Login...

Email

Password

Register Now!!

Email

Password

Password Again

Login!!

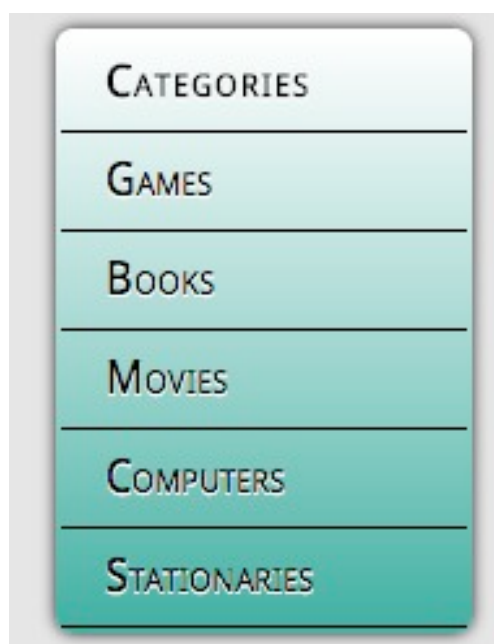
Register

4.1.6. Slider:



A slider is added to the home page, to advertise the products and a little description about it.

4.1.7. Navigation For Categories:



A navigation bar having different categories for users to browse through according to their needs is placed there on the left side bar.

4.1.8. Sub-Menu's:

SUB-CATEGORIES

STORAGE




SOUND

This is The Header of an Advertisement

We offer Advertisement display here

Products: Computers

Category: Computers [x]

	<p>Philips Jogs Headsets By Philips Computers Rs. 700.00</p>	<p>Sound Add to cart</p> <p>Will Be delivered in 3 Working days</p>
	<p>Sennheiser Gaming Headphones By Sennheiser Computers Rs. 3000.00</p>	<p>Sound Add to cart</p> <p>Will Be delivered in 3 Working days</p>
	<p>HP Mini 8GB Pen Drive By HP Computers Rs. 360.00</p>	<p>Storage Add to cart</p> <p>Will Be delivered in 3 Working days</p>

After opening a category, users have option to browse in specific category more in- depth for what they were looking for.

SUB-CATEGORIES

STORAGE



SOUND

This is The Header of an Advertisement

We offer Advertisement display here

Products: Computers Storage

Category: Computers [x] Sub-Category: Storage [x]

	<p>HP Mini 8GB Pen Drive By HP Computers Rs. 360.00</p>	<p>Storage Add to cart</p> <p>Will Be delivered in 3 Working days</p>
	<p>Transcend 4GB Pendrive By Transcend Computers Rs. 200.00</p>	<p>Storage Add to cart</p> <p>Will Be delivered in 3 Working days</p>

Chapter 5

5. Conclusions and Future Work

5.1. Conclusion

The project's aesthetic views and back-end have been worked upon. The layout for future progress has been built. Further enhancements are to be done which will allow the website to be much friendlier and safe for the people to buy products on.

5.2. Limitation

- a. The system is manual thus it does not provide a graphical user interface.
- b. Needs more space for maintenance, the current system is very time consuming.
- c. It is very difficult to search the detail of a customer or the event detail for anyone unless he/she wastes his time to search it manually.
- d. It is very difficult to create the report manually.
- e. It creates confusion and makes it difficult to find the details of the customer. Many a times the records are not found.
- f. This type of working system increases the workload of the person who is looking after these diaries.
- g. Due to calculations error in the bill may lead to loss either to dealers or customers. Sometimes it may lead to quarrel between dealers & customers.

5.3. Further Enhancement

- a.** System will be website based, user friendly and efficient, so that even a non technical user can use the system without any difficulty.

- b.** Security will be maintained in this system. No one will be able to see the undesired data unless the administrator permits him.

- e.** More pages to be added to make the site more user friendly and solve all the problems that a user might face.

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